IN THE CLAIMS

Please cancel claim 3:

1. (Currently Amended) A process for controlling the lean operation of an internal combustion engine, provided with a nitrogen oxide storage catalyst, the process comprising:

performing a first operating phase (lean operation), comprising storing, as a storage phase, nitrogen oxides produced by the internal combustion engine for a specific storage time in the nitrogen oxide storage catalyst,

switching to a second operating phase (rich operation) after the storage time expires, by a control device as the engine control at a specific switching instant for a specific discharge time as the discharge phase in which the nitrogen oxides which have been stored during the storage time are discharged from the nitrogen oxide storage catalyst,

flowing the nitrogen oxide mass upstream of the nitrogen oxide storage catalyst and/or downstream of the nitrogen oxide storage catalyst each being integrated over the same time interval,

determining a switching operating point in a first process step, to establish the instant of switching from the storage phase to the discharge phase, at least from the integral value of the nitrogen oxide mass flow upstream and/or downstream of the storage catalyst, and

comparing the respective switching operating point in a second process step to a definable operating field which is optimized-with respect to a fuel savings potential as a function of a load acceptance of the internal combustion engine, which is formed by a plurality of individual operating points for one new and one aged storage catalyst;

determining a relative nitrogen oxide slip as the difference between the nitrogen oxide mass flow which has flowed into the nitrogen oxide storage catalyst and the nitrogen oxide mass

flow which has flowed out of the nitrogen oxide storage catalyst to establish the switching instant from the storage phase to the discharge phase relative to the storage time, and

bringing the quotient of the integral values of the nitrogen oxide mass flow upstream and downstream of the nitrogen oxide storage catalyst into a relative relationship with a definable degree of nitrogen oxide conversion which has been derived from the exhaust boundary value, so that when these given switching conditions are present in the case of a switching operating point which is within the operating field, switching from the storage phase (lean operation) to the discharge phase (rich operation) is carried out at the switching instant which has been optimized with respect to fuel consumption and the storage potential.

whereby when a switching operating point is located within an operating field, the engine control enables lean operation and thus switching between the storage phase and the discharge phase of the nitrogen oxide storage catalyst, while the engine control conversely dictates lambda operation of the internal combustion engine at which lambda is equal to 1 for a switching operating point which departs from a definable operating field.

2. (Previously Amended) The process as claimed in claim 1, further comprising spanning the operating field depending on the load by a savings potential boundary curve for a new nitrogen oxide storage catalyst and by a savings potential boundary curve for an aged storage catalyst which represents a boundary ageing state.

3. (CANCEL)

4. (Currently Amended) The process as claimed in claim 1, [[3]] wherein:

the relative slip is the quotient of the integral over the nitrogen oxide mass flow downstream of the nitrogen oxide catalyst and of the integral over the nitrogen oxide mass flow upstream of the nitrogen oxide catalyst and

wherein this quotient for determining the switching condition is set equal to the definable switching threshold value K which originates from the definable degree of nitrogen oxide conversion so that when this switching condition is met, switching to the discharge phase takes place from the storage phase at the end of the storage time which was thus determined.

5. (Original) The process as claimed in claim 4, wherein

the switching threshold valve K satisfies the following equation:

$$K = 1 - \text{defined rate of nitrogen oxide conversion}$$

with a given rate of nitrogen oxide conversion of less than 1, preferably with a given rate of nitrogen oxide conversion of at least 0.80, at most preferably of 0.95.

6. (Previously Amended) The process as claimed in claim 1, wherein

the switching operating point is determined as a function of the instantaneous operating temperature at the switching instant to determine the degree of ageing of the storage catalyst from the integral value of the nitrogen oxide mass flow upstream and/or downstream of the storage catalyst and/or the switching instant when the switching condition is met, and

further comprising comparing the respective switching operating point in a second stage for determining the degree of ageing of the storage catalyst to a definable storage catalyst capacity field which is optimized with respect to fuel consumption, which runs over a temperature window, and which is formed by a plurality of individual operating points for a new and an aged storage catalyst,

such that the switching operating point which lies within the storage catalyst capacity field does not constitute a failure to reach the minimum nitrogen oxide storage capacity, but represents the change relative to the prior operating point as a measure of storage catalyst ageing, and

wherein a switching operating point which departs from the storage catalyst capacity field indicates a failure to reach the minimum nitrogen oxide storage capacity.

7. (Previously Amended) The process as claimed in claim 6, wherein

the storage catalyst capacity field relative to the temperature window is limited by the boundary line for a new storage catalyst and by the boundary line for an aged storage catalyst which constitutes a boundary ageing state.

8. (Previously Amended) The process as claimed in claim 6, wherein

the temperature window comprises temperature values between approximately 200°C and approximately 450°C.

9. (Previously Amended) The process as claimed in claim 6 further comprising setting an error signal in the engine control device in the event of a failure to reach the minimum nitrogen oxide storage capacity.

10. (Previously Amended) The process as claimed in claim 1, wherein the nitrogen oxide mass flow is modeled upstream of the nitrogen oxide storage catalyst.

11. (Previously Amended) The process as claimed in claim 1 further comprising measuring the nitrogen oxide mass flow downstream of the nitrogen oxide storage catalyst by means of an nitrogen oxide sensor.